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EXECUTIVE SUMMARY

PURPOSE

The Point Defiance and Tahlequah Ferry Terminal Siting Feasibility Study explores both the possible relocation of the Point Defiance Terminal and the expansion of Tahlequah Terminal to meet larger vessel parameters and the demands of a possible system wide route changes. The Tahlequah Terminal would be evaluated and expanded within the current location and the Point Defiance Terminal would look to relocate and expand to the remediated Asarco Superfund site.

RESULTS

The focus of the Feasibility Study involved investigating the two individual sites in order to produce 3 viable concepts for each that meet WSF goals for operational efficiency and demands for the future, while including a wide array of locations and design alternatives. The components of the study evaluate each site concept in terms of environmental, coastal, drainage, traffic, electrical, and roadway disciplines.

Asarco

The Asarco site is currently under remediation and is moving toward being available for development. WSF acting as an anchor tenant to Asarco would allow for the development of a new terminal that would maximize operability as well as integrate WSF with other development thereby increasing opportunity of non-farebox revenue. The three study concepts vary in location, impacts, and size. All allow for upland holding and minimum dock structure. Remaining at the existing Pt. Defiance Terminal was not studied.

Tahlequah

The existing Tahlequah site is minimal. The four concepts build new trestles with varying holding capacity from minimal 2 loading and 2 exiting lanes to complete holding over the water. In addition, Tahlequah contain limitations based on available right-of-way and topographic features. Subsequently, the amount of over water holding varies inversely to available upland holding and parking. Tahlequah concepts are a balance of integration into available space, environmental impacts and operability.

ESTIMATED COSTS

A cursory look at construction costs and environmental factors was achieved to assess the potential relocation sites at Asarco and expansion alternatives at Tahlequah. The study concluded that the relocation cost would range from $37 million to $67 million depending on the location selected and the number of slips constructed. The expansion alternatives at Tahlequah range from $46 million to $81 million depending on the amount of over water holding and number of slips selected.

NEXT STEPS

This phase of the study did not include involving the public, but rather focused on favoring operability and uncovering design and environmental fatal flaws. It is clear that a public outreach would be necessary as the magnitude of relocating a terminal is significant. Although the environmental evaluation did not find any fatal flaws it did note that depending on the number of concepts carried forward and level of public controversy expected would effect requiring an Environmental Impact Statement (EIS) or a lesser Environmental Assessment (EA). Continuing to a master planning level would refine preferred conceptual layouts and allow for a level of detail to determine a more accurate budget proposal. As WSF moves forward, Asarco plans to revisit the 1997 Asarco Master Development Plan in order to update it in accordance with WSF and other developers. WSF should maintain contact with Asarco and its development plans in order to maximize integration onto the Asarco Site.

INTRODUCTION

STUDY OBJECTIVE

WSF is conducting a technical and cost feasibility study to examine alternative terminal sites at Point Defiance that can accommodate larger capacity ferries and the design of a two-slip configuration. The Pt. Defiance Ferry Terminal services the Southland of Vashon Island through Tahlequah. To meet the expanded service at Point Defiance, the Tahlequah terminal will also need to be expanded to accommodate the same large–capacity vessel and increase in passengers. The focus on the Tahlequah site will be to increase the holding capacity and transit facilities on the landside as well as explore potential expansion and redesign of the current slip configuration.

The purpose of this Feasibility Study is to investigate potential Terminal locations and layouts along the Asarco "brown field" remediation site as well as identify potential conflicts with the area. In order to evaluate the site, three differing locations for the relocation concepts were chosen. The locations included are on the far-west end (on the peninsula), a central location and the far-east end of the Asarco site. The three locations offer different conceptual layouts, environmental impacts and construction costs (See Figures 1,2 and 3 on Page 5).

The additional aspect of this Feasibility Study is the reactionary expansion that will occur at the Tahlequah Terminal. In order to meet further demand and the larger vessel, expanding all aspects of the site becomes necessary. Since the existing dock is below both building and operational standards, new dock layouts were evaluated for all four of the developed concepts. The concepts vary from a large over water dock to a minimal dock with large upland holding. Two additional concepts were developed with the idea of expanding the dock structure over time and providing a by-pass road to allow separation of ferry and non-ferry traffic. Additional parking and transit were also integrated into the expansion concepts.

EXISTING CONDITIONS

Pt. Defiance History

The Point Defiance Ferry Terminal is a single-slip facility located in Pierce County near the Point Defiance Zoo and marina. The ferry landing was acquired in the 1951 when Washington State took over the ferry system from the Black Ball Line. It is the southern most ferry terminal owned and operated by the Washington State Ferries. The 65 vehicle capacity Rhododendron Class vessel currently services the route between Pt. Defiance and Tahlequah ferry terminals. The facility's holding lanes accommodate approximately 50 vehicles. The Steel Electric is the relief vessel. Its capacity is 75 vehicles. Ridership on the Pt. Defiance and Tahlequah route in 2003 was 719,594 riders with 417,364 vehicles.

The facility consists of a terminal building, a bus turnout and pedestrian walkway, which were constructed in 1976. A public restroom facility was added in 1985. In 1993, the timber trestle was expanded to accommodate two-lane loading, the existing timber transfer span seats, timber wingwalls, and terminal building and passenger shelter were replaced with new concrete transfer span seats, steel wingwalls, terminal building and passenger shelter.

The Current Preservation Projects planned are to replace the timber dolphins with steel dolphins, programmed to start construction in 2014, and minor maintenance project to preserve the trestle to begin in 2006.

Tahlequah History

The Tahlequah Ferry Terminal is a single-slip facility located in King County on the southern end of Vashon Island. The terminal was built in the 1950's. The trestle, towers, bridge seat, transfer span and wingwalls were rebuilt in 1994. The dolphins were replaced in 2003. The facilities holding lane capacity is approximately 6 vehicles. The additional holding is along the county road. WSF provides free parking in a lot located on the hill across the street from the terminal. There is a pedestrian waiting area at the south end of the dock that holds approximately 10 people. There are no WSF attendants or tollbooths located at this facility.

An Interim Trestle Preservation Project is planned which will consist of minor maintenance to preserve the trestle to begin in 2006.

Asarco Tacoma Smelter History

The Asarco Tacoma Smelter is one of four project areas, which are part of the Commencement Bay Nearshore/Tideflats Site located in Tacoma, Washington. The Asarco smelter property is approximately 67 acres. The property has been used for numerous industrial productions before the 1890's. It has served as a dumpsite for wood waste and a lead smelter and refinery. Asarco purchased the property in 1905. The property was converted into a facility to smelt and refine copper from copper-bearing ores and concentrates from approximately 1912 - 1985. The by-products from the smelting produced products such as arsenic, sulfuric acid, liquid sulfur dioxide, and slag. As a result of the smelting and refining operations, metals such as arsenic, cadmium, copper, and lead were released into the air, soils, and along the shoreline.

Buildings and structures were built on slag fill and the molten slag poured into Commencement Bay, contributed in the extension of the shoreline. Starting in the 1940's, different forms of slag were poured and/or placed in the bay and eventually the 23-acre peninsula was formed. The Tacoma Yacht Club building, the paved access road, and paved parking areas are sitting on that slag surface. It is estimated that approximately 15 tons of slag exist on the smelter property and slag peninsula.

Asarco Smelter demolished the building on the smelter property in 1993-94 under an EPA Consent Decree. Asarco completed the investigation of the Project Area in 1995 as a result of the EPA Consent Order. The primary elements of the remediation for the site, selected by EPA in 1995 are as follows:

1. Demolish the remaining buildings and structures
2. Excavate soil and granular slag from five source areas (the most contaminated areas)
3. Disposal of excavated soils, granular slag, and demolition debris in an on-site containment facility (OCF), which will meet the requirements for a Resource Conservation and Recovery Act (RCRA) hazardous waste landfill
4. Replace the entire surface water drainage system
5. Cap the Project Area (smelter property and slag peninsula)
6. Armor the shoreline of the plant site and slag peninsula against erosion
7. Continue monitoring impacts of Project Area cleanup on groundwater and off-shore marine sediments
8. Integrate cleanup with future land use plans.

In 1998, Asarco began design of the remediation under the 1997 EPA Consent Decree. It was proposed that most of the clean up work would be completed by the end of 2003 and the site would be ready for future development by the end of 2005. This has since been delayed due to lack of funding and Asarco has provided 2008 as a more realistic date.

VESSEL CONSIDERATIONS

The existing vessel sailing the Pt. Defiance and Tahlequah route is the 65-car, 227-foot Rhododendron. The Rhododendron has a 62-foot width and a shallow 10-foot draft. Along with the Rhododendron the 256-foot, 75-car Steel Electric class vessel acts as the relief vessel for the route.

The Feasibility Study was planned for larger vessel capacity that would meet if not exceed the Evergreen Class ferry. The Evergreen class increases the car capacity to 100 cars and significantly surpasses the existing terminal facilities. At 310-feet in length, 73-feet in width and a 15.5-foot draft the upgrade in size alone facilitates larger holding capacity and dock upgrades at Tahlequah. Since the other focus of the study is the relocation to the Asarco Site the new slips will feature the most current standards incorporated into the conceptual layouts. As a minimum the Evergreen class ferry increases capacity for each sailing, however if demand proves to be larger than expected the 130-car Issaquah Class could be used as the primary vessel. All future vessels for the Pt. Defiance/Tahlequah run will be vessels that are already in service within the current system and at a minimum is assumed to be the Evergreen class.

The route itself will benefit from the upgrade of vessel combined with the potential concepts. With the design of two-slip system the route could possess the potential for twice as many runs. Adding the operationally beneficial 2 lane exiting and 2 lane loading

into all the concepts the time "at-dock" could be minimized further compared to the existing configurations.

TRAFFIC ANALYSIS

The traffic effects of the proposed project concepts have been briefly analyzed. The introduction of a larger ferry vessel is not expected to have a substantial effect on the existing roadway traffic at either of the terminal locations. Both Tahlequah Road at the Tahlequah site and N. Ruston Way at the ASARCO site have adequate capacity to easily absorb the additional vehicles from a larger vessel.

Current demand for the ferry peaks at about 100 vehicles per hour, and the planning projection for this project is 120 vehicles per hour. All of the concepts include the ferry holding areas and queue lanes that are large enough to hold all or exceed the expected ferry-bound vehicles.

General traffic control concepts have been laid out for all of the Options with the objectives of providing safe vehicle and pedestrian movements and uninterrupted unloading of ferry vehicles. At the Tahlequah site, the traffic volumes on Tahlequah Road are very low at about 1,900 vehicles per day, and given the limited opportunities for further development near the terminal, they are not expected to grow substantially. Traffic signals are not recommended for the proposed terminal. However, traffic signals are recommended for the holding area in Tahlequah Option 4 in order to automatically direct vehicles to load the ferry without requiring WSF staff on site.

At the Asarco site, traffic volumes on N. Ruston Way are higher at about 5,000 vehicles per day. Signals are recommended at the terminal exit for ASARCO Options 1 and 2, and at the intersection of the Waterfront Drive and N. Ruston Way (planned extension with Asarco) for Option 3.

FEASIBILITY OF RELOCATING PT. DEFIANCE FERRY TERMINAL

PRELIMINARY INVESTIGATION

As discussed previously, the first half of this Feasibility Study investigates the relocation of the Pt. Defiance Ferry terminal to the Asarco "brown field" remediation site. The purpose of the relocation would allow WSF to be part of a new development once the remediation is complete and allow a larger vessel that would directly improve efficiency. Being part of a new development would offer WSF increased opportunity for non-farebox revenue generation. The new terminal and larger vessel would potentially offer greater capacity and turn-around time for operations.

The remediation itself comprises of two components, remediation onshore and remediation offshore. According to Asarco estimates, remediation onshore is due to be complete in 2008. The offshore remediation cap will follow pending funding availability. Once remediation is complete for both onshore and offshore, the Asarco site would then be ready for development.

This section provides overviews of the specific issues identified for the Asarco site from operational, engineering, environmental, and cost perspectives.

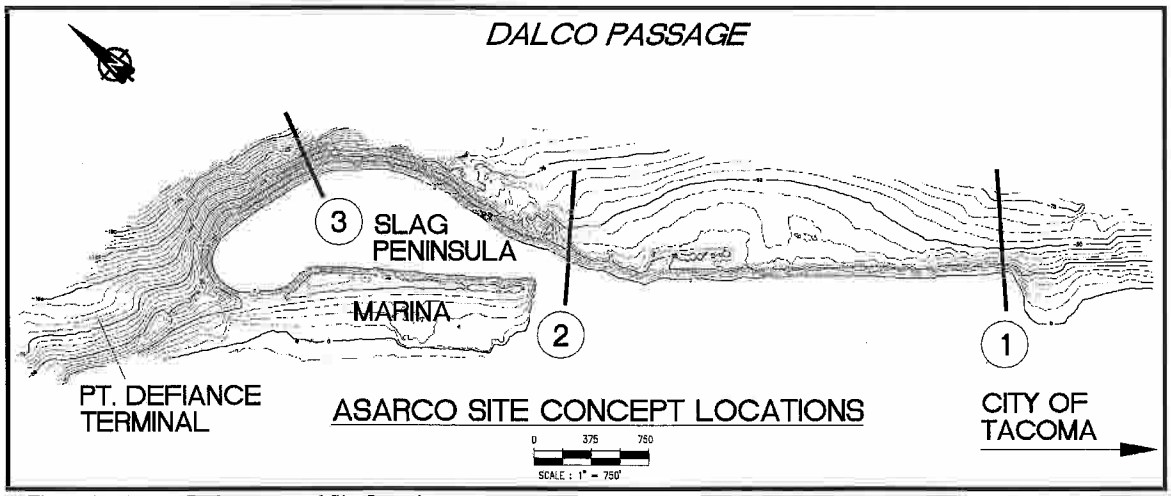

Figure 1 – Asarco Bathymetry and Site Locations

OPERATIONAL

General

The marine slope at the Asarco property is relatively steep from the shoreline down to a depth of 35 ft. below MLLW. Figure 1 is a bathymetric survey of the marine slope in front of the potential terminal sites. The figure shows three section locations at the potential sites for the terminal. Figure 3 demonstrates the current roadway network to the existing Pt. Defiance Terminal and necessary access for the Asarco Site. Asarco Option 1 is located eastern limit off the sediment cap; Asarco Option 2 is located on the proposed sediment cap and Asarco Option 3 is located on the western limit off the proposed sediment cap on the slag peninsula (See Figure 2 and 3).

Figure 2 – Pt. Defiance Terminal and Asarco Location

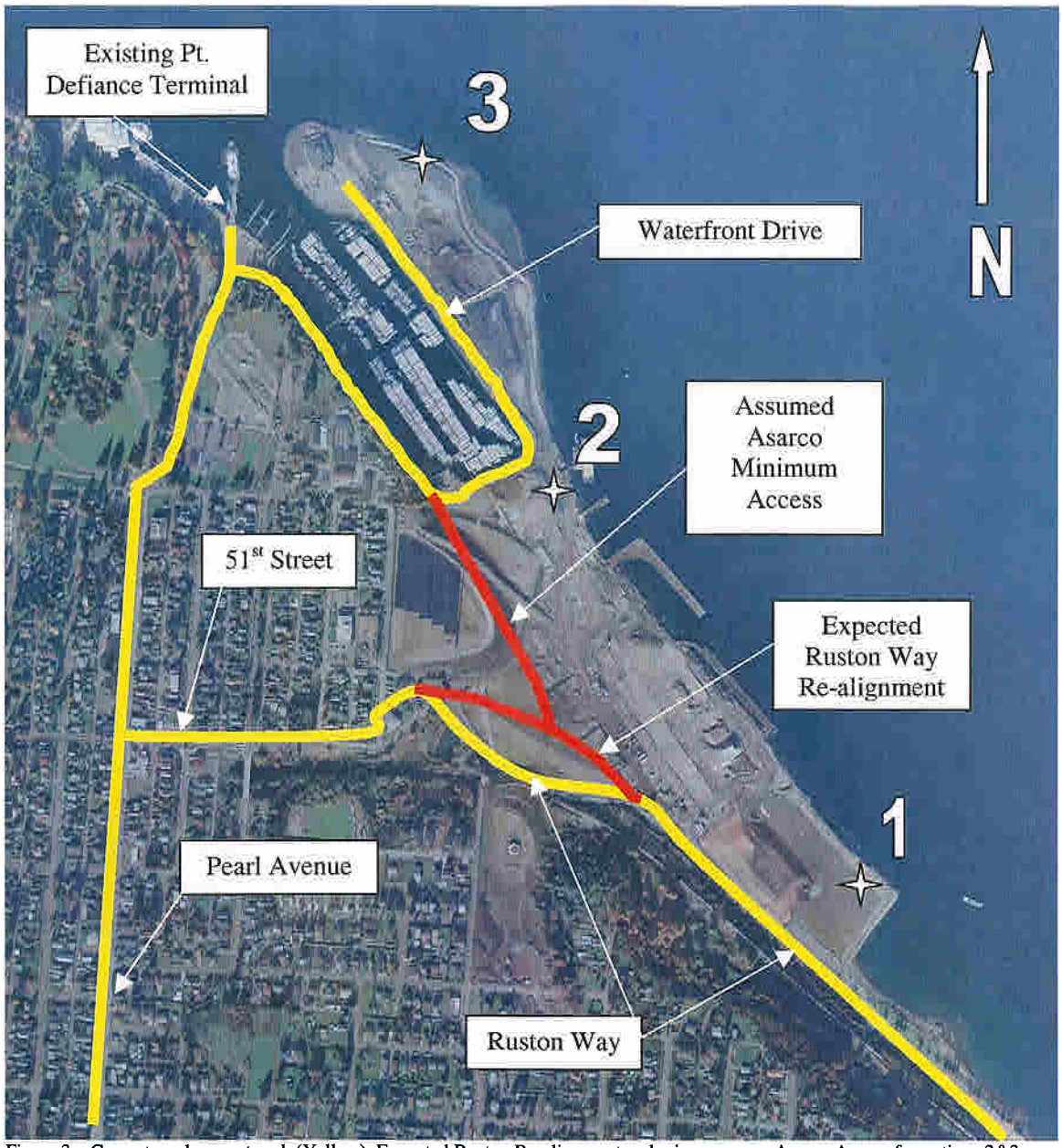

Figure 3 – Current roadway network (Yellow), Expected Ruston Re-alignment and min necessary Asarco Access for options 2&3 (Red), White Stars represent Concept locations.

Current Data

Three methods of analysis were applied to investigate patterns and values of current velocities at the proposed terminal sites (historical modeling, hydrodynamic modeling, and field measurements). In addition, three ferry captain interviews were conducted at the beginning of this study to identify aspects of vessel operation within Dalco Passage. The results of analyses show that eddies form and migrate along the centerline and northern side of the Dalco Passage. Approximately 15% of the time currents are as strong as 3 knots at the Tahlequah dock. These eddies produce a complicated pattern of

current flow that impact the existing ferry docking operations at Tahlequah terminal, but seem to have no presence or effect on the Pt. Defiance Terminal or Asarco shoreline.

Analysis of the current data collected at the proposed Asarco terminal site locations shows that the current does not appear to have eddies. The current on both ebb and flood at Asarco is uniformly westerly moving (as was observed in the historical model). The speed was slower than at Tahlequah, although measurements at Asarco were taken slightly after the peaks of currents in Dalco Passage. Because the proposed Asarco sites do not experience detrimental effect from eddies and current velocities at these sites are generally uniform, the Asarco coastline does not pose any significant risk for maneuvering operations.

Wind and Wave Data

The wave climate at the analyzed terminal sites is the basis for determining the need for shore protection, calculating wave-driven sediment transport, estimating vessel handling in a wave field, and designing structural facilities that might be impacted by moored vessels. Wave measurements are not known to exist in the project area. The wave climate of each project site was determined by applying wind data to a hindcast procedure. Wind data from the National Data Buoy Center at West Point, WA and the Preliminary Design Criteria Report prepared for Asarco conclusions were the basis for calculating extreme waves.

Deep-water waves, not affected by shoaling and refraction processes were calculated for all four terminal sites. Only minimal differences were found between them for waves generated from southeast winds. No preferences to any sites – Pt. Defiance and Asarco locations, could be stated from the perspective of deep-water wave criteria.

True differences in wave parameters at the sites should be expected to occur upon wave propagation to the shoreline, resulting from wave interactions with bottom slope and shoreline orientations. Analysis of computed results tabulated above shows that Asarco Option 1 should be considered a preferred site for terminal location from the perspective of sediment transport criteria for all analyzed wave conditions. The width of the active profile (distance along bottom slope on which waves move sediment) at this site is smaller, thus the effect on sediment transport will be less than at other sites (See Environmental Section for biological sediment transport implications).

Prop Wash Data

The propwash analysis provides information on bottom current velocities and corresponding size of bottom material that would be stable in the current velocity field produced by the vessel as the vessel decelerates during docking. Slowing to stop is assumed to be the most critical maneuver for generating bottom current velocities. In addition to the ferry slowing, the propwash model also assumes the extreme low water

tide level that puts the least amount of water under an Evergreen State Class ferry. The horizontal distance from shore and thus water depth were varied until the condition of "no scour" of bottom sediments, medium sand, was obtained.

Both Asarco Options 1 and 2 are set approximately 170 feet from the upland Asarco cap having an average elevation of +21 feet MLLW. The transfer span bridge seat is typically set at +18 feet MLLW. In order to achieve the +18 feet MLLW a minimum dock length of 100 feet that maintained American Disabilities Act grade requirements was set.

Operating the Evergreen State Class ferry at Asarco Option 1 would require the dock to be located approximately 320 feet from the shoreline in order to avoid scour of bottom sediments in the medium sand size range. Currently Asarco Option 1 shows a minimal dock (including transfer span) past the shoreline of approximately 200 feet and therefore would have to be almost doubled to achieve zero scour of the medium size range.

Operating the Evergreen State Class ferry at Asarco Option 2 would require the dock and transfer span to be located approximately 450 feet from the shoreline in order to avoid scour of bottom sediments in the medium sand size range. Just as Asarco Option 1, Asarco Option 2 shows a minimal dock (including transfer span) past the shoreline approximately 200 feet and therefore would have to be almost tripled to achieve zero scour of the medium size range.

From a propwash perspective, Asarco relocation Option 1 is the preferred alternative as it appears to be less affected by propwash than Option 2.

Vessel Operability and Navigation

Relocating the Pt. Defiance Ferry Terminal to the Asarco property would reduce vessel traffic interference with the ferry when docking. Vessel traffic at Pt. Defiance is heavy, particularly when sport-fishing season is open. The high traffic volume at the Pt. Defiance terminal is due, in particular, to boat launches located to the east of the ferry terminal. Based on estimates from the Boathouse Marina, approximately 15,000-16,000 boats use the launch every year. In addition to the launch, a marina exists to the east of the terminal. The marina contains 180 slips, adding additional traffic to the ferry approach. No tugboat and barge traffic is expected at the proposed terminal sites.

Strong current velocities and eddy formations would not affect the proposed Asarco terminal sites. From the cross current impact perspective, ferry maneuvering at the Pt. Defiance terminal is not complicated. However, relocating the terminal to the Asarco terminal sites would result in the ferry terminal no longer being sheltered from the northeast, east, and southeast winds, which may be a relative disadvantage.

Existing and proposed ferry terminal locations have both advantages and disadvantages from the perspective of navigation conditions, which include pleasure craft and other vessel traffic, current velocities, and winds. Based on discussions with the ferry captains,

the two most critical factors that impact safety during maneuvering are current velocities due to eddy formations and pleasure boats transiting to and from the marina. Based on this opinion, the Asarco sites appear to be preferred relative to the existing site considered and are sufficient from the perspective of navigation conditions.

ENGINEERING

Upland Analysis

The Asarco site is undergoing environmental remediation and will be capped with various layers of compacted low-permeability soil. When remediation is complete the Asarco site will be ready for development and essentially does not have any space limitations for design layouts. The main arterial Ruston Way runs adjacent to the site. Currently, Ruston Way has been detoured to allow traffic thru during the remediation phase. Access to the site has been assumed to be included in what will be a revised version of the 1997 Asarco Inc "Master Development Plan." A revised Asarco master development plan and roadway network for the site has not been established due in part by the remediation taking priority. A new preliminary re-alignment of Ruston Way was provided by Asarco and was used for the main roadway linking the Tacoma waterfront (including Asarco) to the town of Ruston and Pearl Avenue. The WSF terminal concepts utilize and access the planned re-alignment of Ruston Way. This roadway and infrastructure work is not included as part of the engineering and cost analysis. Concepts will show potential roadway networks that are not yet conceived, but do allow simple access to the terminal concept locations.

Utilities

The Asarco site offers access to existing utility systems that can be utilized for drainage, water, and sanitary sewer connections. The existing and future Ruston Way contains the direct access to the expected utilities. The utilities vary in cost based on proximity to the access point, footprint of the concept to be serviced and complexity of the design. The three concepts vary in location across the Asarco site. Asarco Option 1 is the closest to Ruston Way and the smallest footprint overall. Asarco Option 2 is the next smallest footprint, simplest design, but requires utility extension to service the site. Asarco Option 3 is the largest footprint, most complex design, and assumes to access the utilities that feed the Yacht Club. If this is not possible the water and sewer lines would have to be run a significant distance to access Ruston Way. Balanced with simplicity and cost Option 1 is preferred in the drainage/water/sanitary perspective.

The remaining utility to service the site is power and communication. Like drainage, water and sanitary sewer - power is based on serviceability, footprint and complexity of design. In all of the relocation concepts the addition of the second slip is possible. Although, when applied to each of the Asarco concepts the second slip increases cost uniformly no matter what the particular option.

Electrical: There are many electrical and control related components that require consideration in the design of the various terminal options. However, there are no significant electrical / control related issues that would preclude or recommend one siting option over another, with the exception of the cost differences for the electrical service and illumination. Option 1 is the closest to the existing Ruston Way and the existing utilities along it. This Option is within the Tacoma Power service area and would be fairly easy to serve and thus have the least new service charge. Option 2 is in the Town of Ruston electrical service area. Tacoma Power estimated that the line extension needed for this site could be upwards of 2000 feet and would have a larger associated cost. Option 3 would require a line extension of upwards of 3100 feet by Tacoma Power and is thus the most costly service. The service to the Tacoma Yacht Club was investigated, is fully owned by the Yacht Club and is not part of the accessible public utilities. Again, balanced with cost and simplicity Option 1 is preferred.

Phone / Communications: The Telephone / Data Closet size would be approximately 70 sq. ft. based upon the sketch provided on page 132 of the "WSF Terminal Design Standards, Specifications, and Procedures – ELECTRICAL ENGINEERING" document and titled "Telephone / Data Closet Serving Areas up to 5,000 sq. ft." Approximate costs have been included for the Terminal telephone service and the CCTV system.

Terminal Layout

The feasibility focuses on three potential locations chosen to collectively investigate the entire Asarco Site. The three locations included are on the far-northwest end (Option 3), a central location (Option 2) and the far-southeast end (Option 1) of the Asarco site.

All operate with the assumption of providing a minimal trestle structure and having all the holding upland. Just as conceptual layouts try to minimize trestle length and dolphin depths, the concepts also attempt to integrate into the planned final grading cap. The relocation concepts themselves were designed with help from operations. The general design assumptions include 150 car holding capacity, 2 lane exit - 2 lane load configuration, 2 toll booths, bike lanes, transit facilities for 2 standard and 1 articulated buses, kiss n' ride pull up, long-term parking to match holding values, Terminal Building with passenger and WSF staff areas, storage, and one slip (future expansion to 2 slips).

Even with the dock structure minimized the three relocation concepts vary in upland footprint size and configuration. Asarco Option 1 is the smallest and is about 4.6 acres. In comparison, Asarco Option 3 is the largest footprint topping 6.9 acres. A reason for this is attempting to integrate into the finished grading cap planned by Asarco. As an example, in the far-west Asarco Option 3 two large hillsides are to be built up on the peninsula and would therefore require integrating the holding on one side of the hillside. Parking and Transit facilities will be located between the hillsides. Asarco Options 1 and 3 located at the extremes of the Asarco site offer less integration into what the future of Asarco's development may hold, whereas, Asarco Option 2 could have potential to be more of the focal point of the development.

Asarco Option 1 is located at the southeast end of the site on property identified as Viewpoint Park in the Asarco Master Development Plan (Asarco MDP). The site affords panoramic views of Commencement Bay, Tacoma skyline and Mt. Rainier. A 150-car long-term parking area is aligned along Ruston Way behind bus/taxi pull-out lanes and kiss & ride areas. Toll entry booths are oriented so that shoulder holding queues occur along the north bound lane of Ruston Way along an existing waterfront park. A 150-car holding area or 9 lanes with 17 to 20 spaces per lane is laid out in the approach to the transfer spans. The holding area includes a truck lane and an HOV lane. Two exit lanes are located on the northwest side of the holding area. A pedestrian walkway connects the long-term parking and passenger drop off areas to the terminal building. The terminal is located at the shoreline with potential Puget Sound viewing platform to be incorporated into the promenade and pedestrian corridor along the Asarco shoreline. This option provides dramatic views to Tacoma and Mt. Rainier from the holding area. It also results in a contiguous shoreline property to the north for a revised Asarco development scenario. However this scheme would separate the existing shoreline park area to the south from the shoreline promenade contemplated in the Asarco MDP and would occupy a feature park area identified in the Asarco MDP. In the interest of minimizing shoreline parking and vehicle circulation, these functions are proximate to Ruston Way in this option, resulting in a 500 foot to 600-foot pedestrian route from drop-off areas to the terminal. WSF staff parking in this option is located in the long-term parking lot, also relatively remote from the transfer span and terminal.

Asarco Option 2 is a site located near the center of the Asarco MDP at the south end of the Marina. In this option the Asarco MDP traffic circle located at the entry to the proposed Peninsula Park is utilized as an opportunity for kiss & ride drop off with relative proximity to the terminal building and transfer spans. Bus and taxi bays are located along the proposed Peninsula Park Road on the southern end of the Marina. As in Option 1 this location is relatively remote from the terminal and transfer span. However, in this case the pedestrian route affords views of the Marina and might be developed as a significant public plaza. Long term parking is aligned between the bus and holding areas, perpendicular to the Commencement bay shoreline, resulting in shorter travel to the terminal building than Option 1. Option 2 divides the larger Asarco development site into 2 areas, separating the proposed Peninsula Park from the mixed-use development area and interrupting the shoreline promenade. The existence of historic piers adjacent to this site provides potential for thematic and historic continuity of uses. Shoulder queue lanes are located along the Ruston Way MDP frontage and might conflict with critical vehicle access points to the MDP site, depending on the final development plan.

Asarco Option 3 occupies a portion of the propose Peninsula Park at the northern end of the MDP site. This option has the least impact on the ASARCO MDP in terms of developable area and access. It separates ferry traffic from Ruston Way. Vehicle queue lanes occur on the Tacoma Yacht Club access road, along the Marina. The main vehicle holding area is located between the Yacht Club and one of two upland cap hills comprising contaminated material dredged from the Marina. Long-term parking is located on the Sound side of the same hill with a kiss & ride round about located at the shoreline and proximate to the terminal building at the transfer span. In this option major

paved areas (holding and long term parking) are separated by the man-made upland cap. The hill is a potential landscape area and viewpoint with possible connection to a revised Peninsula Park plan.

Offshore Structures: Over the water, the slips were positioned so the bow of a berthed vessel is 100 feet out from the minus 20 ft. MLLW depth as preferred by WSF's vessel docking depth. The designed dock structures are set at the minimum necessary length to achieve the standard bridge seat height of +18 ft. MLLW from the estimated Asarco cap elevation average of +21 ft. MLLW. Maintaining American Disabilities Act requirements the average dock length 100ft was found (See ADA Appendix for requirements).

The concept's slip orientation demonstrates the transfer spans aligned perpendicular to the shoreline. This is due in part from environmental considerations during peak prop wash scour (Please see Coastal Engineering Appendix, and the Operability and Environment section for more information). Once the slip orientation was complete the dolphin layout design was investigated.

In past dolphin projects, the maximum depth for driving piles has been minus 50-55 feet MLLW. The surface below the water, such as sand, rock, clay, etc., also determines whether piles can be driven and at what depths. These are just a couple of determining factors that will affect the location and design of the Slips. Based on just those two criteria, Asarco Option 2 appears to be the preferred design. The estimated cost for the dolphins in all three of the designs will be determined by the pile design. The pile depths in Asarco Option 2 of -55 feet MLLW are deeper but are not to the extreme of Asarco Option 1 at -70 feet MLLW or Asarco Option 3 at -145 feet MLLW and therefore would most likely be the least expensive to build (See Dolphin Layout Appendix).

ENVIRONMENTAL

Findings and Asarco Site Superfund Remedy Considerations

The Asarco site considered is part of the Asarco Superfund site. The Asarco terminal options include two of the Asarco Superfund site units, the upland smelter/slag peninsula and the offshore sediments/groundwater. The upland smelter site remediation began in 1998 and most of the work was completed by the end of 2003. The remaining remediation work consists of placing low permeability earth cover system over the remaining contaminated materials on the upland portion of the Asarco site. Development of the site that involves regrading, excavation, or foundation pile installation would require replacement or repair of the low permeability cover to achieve equivalent function and protectiveness. Generally the upland development for the WSF terminal would require minimal excavation, foundation pile installation and regrading. Any paving that is conducted as part of the terminal development would improve the overall protectiveness of the surface cap. Raising the surface grade above the low permeability cap would also improve protectiveness by providing a thicker barrier layer over the underlying contaminated materials.

The nearshore/offshore sediment cleanup plan calls for placing a sediment cap over the most severely contaminated areas. At this time, Asarco has completed the 100% design document for capping, but the timeline for implementation is not certain. The nearshore/offshore capping materials will vary by location. Riprap is planned for the steep nearshore and shallow subtidal zones, gravel and sand in the moderately sloped nearshore/offshore areas, and sand and silt in the flatter offshore areas. Asarco Options 1 and 3 are located just off the nearshore/offshore remediation delineation, whereas Asarco Option 2 is located on the planned cap. In both forms of remediation the key component, especially when contamination is left on site, is to maintain the integrity of the remedy. Nowhere is this clearer than in the combination of a ferry scour affecting the planned offshore cap.

Asarco Options 1 and 2 terminal locations were the focus of the effect on the future sediment remediation cap by prop wash. The options ultimately considered in this feasibility study differ slightly from the options modeled for prop wash (see Environmental Considerations Appendix). However, the possible impacts identified are sufficiently similar for this level of analysis. Asarco Option 3 was not evaluated for prop wash because the potential location is located sufficiently to the north of the sediment cap such that no adverse effects would be expected. Evergreen State Class Ferry is the assumed design vessel.

The slips at Asarco Option 1 are in rather deep water compared to Asarco Option 2 and have less current speeds. At extreme low tide, water depths at the head of each slip would be about 46 feet MLLW. Depending on location, fine sand to coarse gravel could be transported by the propeller wash. Note that the estimated scour pattern lies outside the limits of the planned Asarco sediment remediation cap, but is considered a "moderate impact area." Based on this, no mitigation considerations or costs are assumed for the ferry terminal at the Asarco Option 1 location (Refer to the Operability section for a zero scour condition). It is assumed for purposes of this Study that localized redistribution of these moderately impacted sediments by prop wash is allowable such that additional sediment remediation over that currently planned would not be required.

Asarco Option 2, located centrally on the Asarco site, lies directly on the sediment remediation cap. Sediment transport would occur and vary from fine sand to 8-inch diameter stones. This indicates that if the ferry terminal were sited at this location, there would likely be adverse scour impacts to the remediation cap that would require mitigation. To maintain the remediation cap's integrity for protection of the underlying contaminated sediments further armoring, to withstand current velocities by the ferries, would be needed.

This Feasibility study assumes that Asarco has placed the sediment remediation cap prior to WSF's construction of a ferry terminal. It is assumed that additional armoring of the cap would be necessary to account for the higher ferry prop wash velocities. The estimated prop wash currents are strong enough to transport various grain sizes in the gravelly sand fish mix used to promote fish habitat. The riprap used in the cap is expected to withstand transport, so only the fish mix component may be scoured from

parts of the riprap cap. Scour would also occur in the sand and silt sediment cap area offshore from the riprap. It is assumed that this material would be replaced with the armor stone material and gravel.

Natural Resource Considerations

Upland Habitat: The upland habitat is industrial and was largely created by smelter slag fill. There is no significant wildlife or vegetation habitat.

Wetland Habitat: There are no upland wetlands identified by Washington Department of Fish and Wildlife. The shoreline along the slag peninsula is classified as estuarine wetlands, which are essential areas that are flooded at high tide and contain grasses and emergent plants. Some mitigation measures may be required for any permanent disturbance of this type of habitat. Mitigation measures may include onsite restoration, offsite mitigation, or payment of some monetary amount into a general tidal restoration fund. The amount of restoration / mitigation cannot be determined at this time, but it is probable it will be limited compared to other shoreline areas of the Puget Sound due to the current contamination conditions.

Marine and Fish Habitat: There is no documented eelgrass in any of the proposed terminal site locations. However there is eelgrass beds 200 feet to the east of the Asarco property along the Ruston Way shoreline.

Fish species using the nearshore include outmigrating juvenile Coho, chum, and Chinook salmon and steelhead from the Puyallup River system. Resident fish include various flatfish species, rockfish, cabezon, lingcod, and sculpins.

The primary impacts during construction include sound pressure and turbidity from pile driving. The terminal sites being considered would have very short trestles due to the steepness of the shoreline, minimizing the number of pilings required for the terminal. The coarseness of the substrate where the pilings would be placed would minimize the amount of turbidity produced.

Due to the presence of salmon at all of the terminal option sites, the various federal resource agencies would likely require that all in-water work be conducted between July 16 and February 16 to minimize impacts on outmigrating juvenile salmon. It is also likely that the services would require usage of bubble curtains during pile driving to attenuate sound pressure levels, thus minimizing impact on fish and birds.

Operational impacts of the terminal option sites include scour and shading. The most substantial operational impact to the marine environment would be the scouring of the bottom substrate at the proposed docking areas of each slip from the prop wash of the ferries, as discussed above for Options 1 and 2. The scour zone from prop wash would be expected to remove some of the substrate materials smaller than cobble and would most certainly scour out the fish-mix within the riprap over most of the scour zone. This would greatly diminish benthic productivity in the scour pocket. Riprap or similar substrate is

generally considered to be less productive for juvenile salmonids than sand substrates. Replacement of sand with large rock would be an impact to the marine habitat. The resource agencies would most likely require that this loss of habitat be mitigated at the existing ferry terminal location where habitat restoration potential is high.

Shading impacts include the reduction of primary productivity under overwater structures and the diversion of juvenile salmonids to offshore areas around the structures. Such impacts, however, are greatly minimized by the small area the trestles actually cover.

Endangered Species Act

Bald Eagle: The terminal option sites are not located within bald eagle territory. The nearest nest in the eagle territory is about 1.25 miles away from terminal Option 2 location. However, it can reasonably be assumed that bald eagles would feed nearby along the shoreline and in the Dalco Passage. Therefore, the only potential impacts on bald eagles would be those that relate to their food resources and these impacts are likely to be minimal.

Marble Murrelet: None of the proposed terminal option sites contain marbled murrelet nest sites, nor do they contain any potential nest sites, due to lack of suitable old growth tree stands.

Stellar Sea Lion: There are no stellar sea lion breeding grounds or haul-out areas within the project limits.

Chinook Salmon and Bull: Chinook salmon and bull trout are listed as threatened under the ESA. Chinook salmon are expected to use the nearshore area along the Asarco site as juveniles during their outmigration from the Puyallup River system. The occurrence of adult or juvenile bull trout along the shoreline area is not known, as the distribution of anadromous bull trout in Puget Sound as a whole is not well documented.

The potential impacts to Chinook salmon and bull trout are essentially the same as those that have been discussed above for marine habitat.

Southern Resident Orca Whales: The Southern Resident Orca Whale population, which includes Puget Sound resident orcas, was proposed for ESA listing on December 16, 2004. Orca whales may be present in the terminal option sites.

Upland Geotechnical Considerations

All proposed terminal sites are located outside the boundary of the potentially liquefiable (low shear strength) soil. Therefore, this soil does not pose any additional design considerations or costs to the options considered.

NEPA / SEPA Considerations

A project must conform to the requirements of the National Environmental Policy Act (NEPA) when that project includes participation of federal agency. WSF projects typically involve a federal agency, either the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) because that agency either has committed to or is anticipated to provide funding for project implementation. As a superfund site, Asarco is working directly with the Environmental Protection Agency (EPA) and will continue to do so in the future for required ongoing monitoring of the site. Other federal agencies could also be involved because a federal permit will be required, such as U.S. Army Corps of Engineers' Section 10 permit, which is required for placing structures within navigable waters. Because the project will require construction in the Puget Sound, a Section 10 permit is required and NEPA documentation is necessary.

Based on the currently anticipated number of alternatives, the estimated significance of both positive and negative effects when measures have been included with the project description to minimize those effects, and likely level of agency and public outreach, the appropriate level of environmental documentation is an Environmental Assessment. This recommendation is consistent with other terminal relocation projects.

FEASIBILITY OF EXPANDING TAHLEQUAH FERRY TERMINAL

PRELIMINARY INVESTIGATION

The second half of this Feasibility Study investigates the expansion of the Tahlequah ferry terminal. The purpose of the expansion would allow for a larger vessel that would directly improve efficiency in terms of capacity and turn-around time. Constructing a new terminal could also offer WSF increased opportunity for non-farebox revenue generation. Four new expansion concepts have been designed to demonstrate diverse solutions for the Tahlequah site.

This section provides overviews of the specific issues identified for the Tahlequah site from operational, engineering, environmental, and cost perspectives.

OPERATIONAL

General

The existing Tahlequah terminal (see Figure 5) is located near a shoal at the mouth of Tahlequah Creek at the southern end of Vashon Island. Residences have been built near the shoreline in the project vicinity and several properties have revetments and seawalls, indicating the level of wave energy affecting the shore. The bottom slope along the terminal dock is a relatively wide beach that transforms into a steep slope that drops to a depth of approximately 100 ft. Figure 4 is a bathymetric survey in the vicinity of the terminal. The figure shows a bottom depression at the dock that may be the result from dredging and partially from propwash effects.

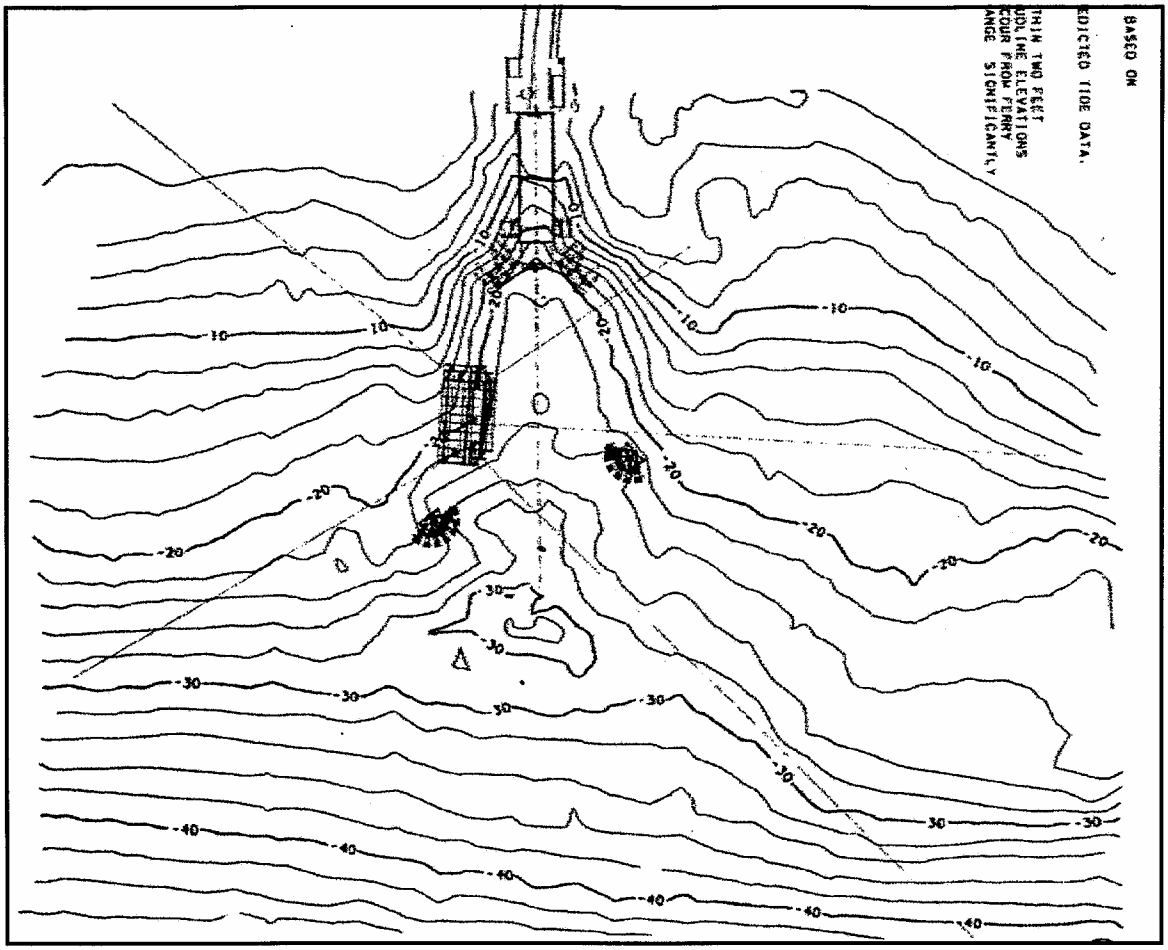

Figure 4 – Tahlequah Bathymetry

Current Data

Three methods of analysis were applied to investigate patterns and values of current velocities at the expansion concepts (historical modeling, hydrodynamic modeling, and field measurements). In addition, three ferry captain interviews were conducted at the beginning of this study to identify aspects of vessel operation within Dalco Passage. The results of analysis show that eddies form and migrate along the centerline and northern side of the Dalco Passage. Based on field measurements and predicted tidal characteristics, 3 knot currents were measured and can be exceeded 15% of the time. These eddies produce a complicated pattern of current flow that impact the existing ferry docking operations at Tahlequah terminal.

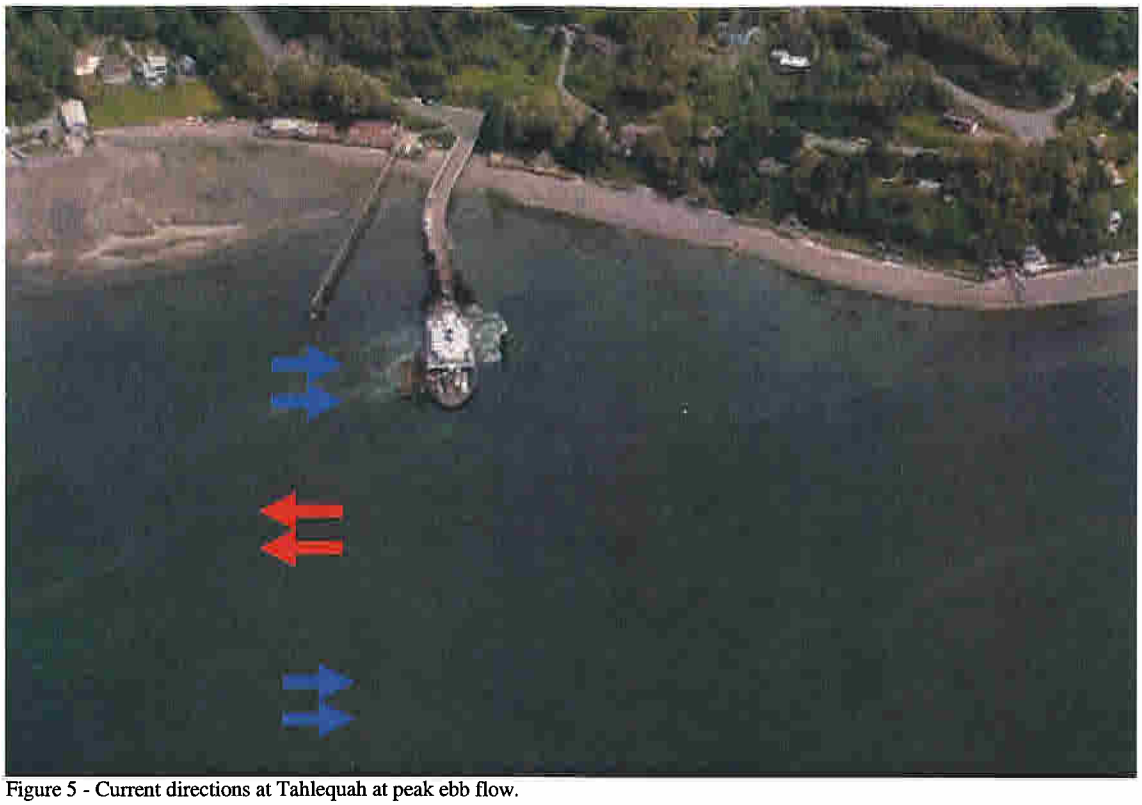

Figure 5 - Current directions at Tahlequah at peak ebb flow.

Tidal currents are reported by the ferry captains to be troublesome during docking at Tahlequah. Three interviews with the ferry captains were conducted during the course of the study to determine the scale and boundaries of the tidal current patterns related to the navigation problem for existing and possible modifications of the terminals. A Technical Memorandum presenting results of the interviews was prepared in July 2004 and is attached as the Coastal Engineering Appendix. In general, based on the descriptions by the ferry captains, the pattern of current velocities appears to be as follows:

As the ferry approaches the Tahlequah dock during the peak of the ebb flow, the vessel is subjected to currents of different directions and velocities. The currents in Dalco Passage, specifically at the Tahlequah site, are composed of different zones of flow moving in opposite directions. Within the separate zones the direction of flow is similar from the water surface to the bottom. The width of each zone is relatively small and is comparable to the length of the ferry. Figure 5 illustrates the conceptual picture of the flow pattern described by captains. As a ferry approaches the dock the flow pushes the vessel first toward the west as the bow is one vessel length from the dock, then toward the east, and again toward the west as the bow is at the dolphins. The conditions of maneuvering during certain ebb flow conditions are extremely difficult and impose a risk of safety and damage to the dock and the ship.

As a result, the proposed modifications to the existing Tahlequah ferry terminal, such as extension of the dock and altering the dock alignment, appear not to significantly reduce the impact of eddy currents on the ferry or to improve safety conditions during docking.

Based on discussions with the ferry captains, it is suggested that a solution may be to replace the existing ferryboat with a more powerful boat having better maneuverability.

Wind and Wave Data

The wave climate at the analyzed terminal sites is the basis for determining the need for shore protection, calculating wave-driven sediment transport, estimating vessel handling in a wave field, and designing structural facilities that might be impacted by moored vessels. Wave measurements are not known to exist in the project area. The wave climate of each project site was determined by applying wind data to a hindcast procedure. Using wind data from the National Data Buoy Center at West Point, WA and the Preliminary Design Criteria Report prepared for Asarco, conclusions were found for extreme conditions.

Calculations were conducted for deep-water waves that are not affected by shoaling and refraction processes. No preferences to any sites could be stated from the perspective of deep-water wave criteria.

Differences in wave parameters at the sites should be expected to occur upon wave propagation to the shoreline, resulting from wave interactions with bottom slope and shoreline orientations. A typical characteristic indicating the extent of natural sediment movement due to wave processes is the active profile width. Having a larger active profile width at Tahlequah indicates bottom sediments may be naturally mobilized over a wider portion of the bottom profile. Tahlequah's relatively gentler bottom slope than at Asarco sites and similar closure depth (calculated depth to which sediment is mobilized by waves) identify a greater risk of impact from the presence of typical (pile supported) ferry dock structures when compared to the Asarco sites. The possibility exists that a portion of the disturbed sediment could be permanently displaced down slope outside of the active profile width. A wider active profile could contain a larger volume of sediment in motion than would be the case for a narrower but steeper active profile, all else being the same. Therefore, a dredged area at Tahlequah, for example, may experience more sediment infill as a result of storms than would an area dredged to similar dimensions at Asarco sites (See Coastal Engineering Appendix for more information).

Analysis of computed results shows that the Tahlequah site is more apt to produce sediment transport for all analyzed wave conditions. The active profile at this site is wider, thus the effect of nearshore structures on sediment transport will be more than at other sites (See Environmental Section for biological sediment transport implications).

Prop Wash Data

The propwash analysis provides information on bottom velocities and corresponding size of bottom material that would be stable in the velocity field produced by the vessel as the vessel decelerates during docking. Slowing to stop is assumed to be the most critical maneuver for generating bottom velocities. In addition to the ferry slowing, the

propwash model also assumes the extreme low water tide level that puts the least amount of water under the Evergreen State Class ferry.

Some scour of the bottom sediments should be expected if ferries having more horsepower and larger propellers than the Rhododendron (the current vessel) would operate at the dock with no pier extension.

Extending the dock along the existing alignment would present a risk for bottom scour for all of the analyzed ferryboats, as determined from velocity calculations. The along-slope distances listed in table 4 of the Coastal Engineering Appendix indicate the relative extent of potential bottom adjustment, assuming sand comprises the bottom, caused by operating the larger ferries.

Altering the alignment relative to the channel may result in scour even for the existing ferry. The bathymetry indicates the existing ferry operation maintains a particular depth pattern in the bottom sediments. To move the ferry operation to another location (changing channel alignment) would subject an area to scouring velocity that has not previously experienced it. If altering the alignment of the dock is selected as a preferred alternative, modeling of the bottom effects can only be completed with specific dock alignment and type of ferries specified.

The analysis of the computed results indicates that the Tahlequah terminal would be affected by propwash in the existing pier condition. Extending the dock and altering the pier alignment is needed for the larger ferries to operate at the terminal with minimal propwash impacts.

Vessel Operability and Navigation

Navigation conditions criteria discussed herein include the effects from vessel traffic in Dalco Passage on ferry maneuvering, docking, and undocking procedures. In addition, the navigation conditions criteria account for current velocities in the vicinity of the terminal and wind effects on ferry maneuvering during docking operations.

Ferries encounter tug and barge traffic during approach to the Tahlequah dock. This traffic is relatively infrequent and does not create significant navigation problems with ferry maneuvering and docking procedures.

The current velocities at the terminal have significant effect on navigation. As discussed in the Current Data Section) during certain ebb tide conditions ferry docking operations may pose a risk to safety of vessel and dock structures. In addition, the ferry terminal is exposed to wind impacts from east and southeast winds.

Existing and proposed ferry terminal locations have both advantages and disadvantages from the perspective of navigation conditions, which include pleasure craft and other vessel traffic, current velocities, and winds. Based on discussions with the ferry captains, the two most critical factors that impact vessel operability and navigation during

maneuvering are current velocities due to eddy formations at Tahlequah and pleasure boats transiting to and from the marina at Pt. Defiance.

ENGINEERING

Upland Analysis

Four expansion alternatives have been developed for the Tahlequah site. The main challenge pertaining to the Tahlequah terminal site is integration into the existing upland topography and the existing right-of-way. Unlike the Asarco discussion, the four options vary from each other in over water coverage and dock configuration. The dock configuration and WSF's shoreline property is separated from the upland property by the contiguous SW Tahlequah Road. The upland arrangements are limited by steep topography. The hillside location of WSF property is heavily forested with deciduous, conifer and under story vegetation. In general, the expansion concepts explore three basic ideas that undergo very different ramifications. The first idea is a large dock structure to facilitate large holding abilities and direct loading, but emphasizes over water coverage. The second and third poses a solution of a phased structure that includes a minimum four-lane dock that could then be expanded according to increased volumes and available funding. The final configuration proposes complete upland holding connecting to a bridge structure then to a minimal one-slip dock with dedicated two-lane loading and offloading. Since the size of upland development varies within these ideas, so does the required additional right-of-way.

Utilities

The existing Tahlequah Ferry Terminal currently consists of a small dock and an approximate 36-space parking lot. Drawings from the past project at Tahlequah indicate that there is a drainage system of pipes and catch basins which outfalls into the Sound. Runoff from the existing parking lot is treated by a bioswale before it is captured by the existing catch basin system, while existing roadway runoff is currently untreated. Some of these drawings indicate abandonment of a water line running from the shore up to a house that was removed for the construction of the existing upland long-term parking lot. The drawings do not indicate the source of the water, but is surmised to be from well water. Research shows there are no existing water lines or sanitary sewer lines in the site area to tie into, and that the surrounding properties to the Tahlequah Ferry Terminal site all use water wells and septic tanks (or leach fields). The proposed Tahlequah Ferry Terminal will have to use a water well and septic tank (or leach field) as well for its water supply and sanitary sewer discharge.

Storm Drainage: Drainage for the four options is designed to capture and treat surface runoff in the areas of improvement, including the dock, parking lots, holding lanes, and roadways. The runoff from the parking lots and roadways will be captured and directed down to an oil/water separator at the shoreline where it will separate the oil from the runoff before discharging it into the Sound. Since the storm runoff on the existing terminal parking lot is only partially treated by bioswale and the storm runoff on the

existing roadway system is currently being discharged without treatment, the new design allows for 90,000 sq. ft. to 120,000 sq. ft. of improved storm water treatment.

Tahlequah Option 1 utilizes the existing parking lot and, therefore, much of the existing drainage system can be used. Tahlequah Option 2 has a large amount of new roadway work and surface runoff that will require capture and treatment. Tahlequah Option 3 has the largest amount of new roadway work and surface runoff that will require capture and treatment. This option also utilized the existing parking lot, and, therefore, much of the existing drainage system can be used. Tahlequah Option 4 has a large amount of new roadway work and surface runoff that will require capture and treatment.

Water Supply: Placement of the water well in each option is based on a 100' radius separation required between the well and all other structures and/or facilities. In all four options, the water wells are located up on the hill adjacent to the parking lot facilities and, in three of the options, will require acquisition of additional property (See Drainage Technical Memorandum).

Sanitary Sewer: Placement of the septic tank (or leach field) for all four options will be adjacent to the roadway and dock down by the waterfront. Since the properties along the waterfront also use septic tanks (or leach fields), the utility design for the four Tahlequah options include the placement of a septic tank (or leach field) along the shoreline roadside. Proposed sanitary sewer design utilizes proposed and existing grades sufficient to allow for gravity flow. Pumping should not be required. However, in the event the elevations of the proposed septic tank (or leach field) require pumping, a sanitary sewer pump has been included in the cost estimate.

Gas: There is no need for gas services at the proposed Tahlequah Ferry Terminal site.

Electrical: There are many electrical and control related components that require consideration in the design of the various terminal options. However, there are no significant electrical / control related issues that would preclude or recommend one siting option over another.

Tahlequah Option 1 utilizes the existing parking lot and, therefore, much of the existing illumination system can be used. Tahlequah Option 2 has a large amount of new roadway work, requiring a number of additional roadway lighting standards as indicated in the table on the previous page. Tahlequah Option 3 has the largest amount of new roadway work, requiring a number of additional roadway lighting standards. This option also utilized the existing parking lot, and, therefore, much of the existing illumination system can be used. Tahlequah Option 4 has a large amount of new roadway work, requiring a number of additional roadway lighting standards.

Phone/Communication: The Telephone / Data Closet size would be approximately 70 sq. ft. based upon the sketch provided on page 132 of the "WSF Terminal Design Standards, Specifications, and Procedures – ELECTRICAL ENGINEERING" document

and titled "Telephone / Data Closet Serving Areas up to 5,000 sq. ft.". Approximate costs have been included for the Terminal telephone service and the CCTV system.

Terminal Layout

The feasibility focuses on four potential alternatives to the Tahlequah Site. Provided with topography contours and coastal bathymetry for the Tahlequah Site, the four expansion concepts collectively provide varied solutions.

The relocation concepts themselves were designed with help from WSF Operations Department. The general design assumptions include 150 car holding capacity, 2 lane exit - 2 lane load configuration, transit facilities for 2 standard buses, kiss n' ride pull up and maximum allowable long term parking.

Tahlequah Option 1 places vehicular holding (150 cars) on a 150-foot wide dock over the water. The dock has a prototypical "hourglass" configuration due to the operational restriction to one entry lane (where toll booths are not used) with multiple holding lanes on the dock. The shape also permits increased daylight at shallow water depths to minimize effects on subsurface vegetation and fish species. Passenger drop off and transfer span are separated by a distance of about 475' in all Tahlequah Options due to distance of the span from the shoreline and the operational preference for passenger waiting areas close to the transfer span. 70 long-term parking spaces are added on the hillside.

Tahlequah Option 2 places 75 cars over the water on a narrow dock with future expansion of dock width to 150-foot and re-routes the highway to provide one-way movement at the entry and drop-off area. The highway is relocated on the plateau of present long-term parking to minimize conflicts with passenger drop off and vehicular exiting functions. New and expanded long-term parking areas are located further up the hill on retaining wall supported terraces. Two long-term parking lots (total 70 spaces) replace the existing 35-space lot.

Tahlequah Option 3 is identical to option 2 with the exception that the highway is re-located further up-hill and long-term parking is expanded closer to the pier. 70 long-term parking spaces are added on the hillside.

Tahlequah Option 4 places 110-car holding on the upland hillside with substantial retaining wall support and a bridge overpass that connects the holding lanes to the pier and transfer span. The result is a minimum width pier to the transfer span (4 lanes). This configuration would minimize the amount of over-the-water construction and maximize the amount of steep slope construction. A 50-space long-term parking lot replaces the existing 35-space lot.

Offshore Structures: Over the water, the slips were positioned so the bow of a berthed vessel is 100 feet out from the minus 20 ft. MLLW depth as preferred by WSF's vessel docking depth. The designed dock structures are set at the minimum necessary length to

achieve the "standard" bridge seat height of +18 ft. MLLW and provide a approximately 20 ft. depth of water.

The Tahlequah Option 1 slip orientation demonstrates the transfer spans aligned as the existing Tahlequah terminal - perpendicular to the shoreline and slightly easterly. Utilizing the existing alignment takes advantage of deeper water closer to the existing slip. However curved structures generally cost more. The three other options retain simple straight and perpendicular alignments (Please see Coastal Engineering Appendix and the Operability section for more information). Once the slip orientation was complete the dolphin layout design was investigated.

The dolphin location depths are not as extreme as those at the ASARCO options, and are not as costly to construct. Tahlequah Option 4 is a single Slip design with no Future Slip planned, therefore it would be the most economical to build. Constructing a future slip would involve replacing existing and constructing additional dolphins at a later date and most likely at an increase in cost. Tahlequah Option 4 is extended into deeper waters and covers less water that the options with over water holding lanes and future slips.

ENVIRONMENTAL

Findings

Four different terminal and parking layouts are currently being considered for the new Tahlequah ferry terminal. All potential terminal locations are to the west of the existing Tahlequah terminal as shown Tahlequah Layout Appendix.

The current terminal operation has resulted in some scouring of the seafloor beneath the slips, which are located above water depths of –10 ft to –20 ft MLLW. The new slips would be placed directly to the west of the existing ones; however, they would be farther offshore, in water depths of about –20 ft to –30 ft MLLW. An area of bottom substrate beneath the new slips would still be scoured, but the scour area would likely be somewhat smaller than it is currently because the slips would be in deeper water and the substrate would be finer. The scour area at the current location (and outside of the predicted scour area for the proposed slips) would most likely need to be restored to natural conditions.

Environmental considerations evaluated for this siting feasibility memorandum include natural resources and slope stability associated with planned uplands parking areas.

Natural Resource Considerations

Upland Habitat: There is no substantial upland habitat that would be disturbed by moving the Tahlequah Dock location slightly to the west of its current location. The impacted area is almost entirely in the tidal zone; save for the roadwork that would need to be constructed to service the new dock. Implementing standard best management practices, such as the replanting any disturbed areas with native vegetation, would mitigate any impacts to upland habitat.

Wetland Habitat: As with the Asarco location, there are no palustrine, lacustrine, or riverine wetlands identified by Washington Department of Fish and Wildlife at the Tahlequah Ferry terminal site. However, the estuarine wetland habitat along the shoreline is moderately higher in quality than the Asarco site.

Marine Habitat: Several species of macroalgae occur on the coarser substrate, and there is a small eelgrass bed about 100 ft. to the east of the current terminal location. There are also two very small patches of eelgrass (less than 5 square feet each) to the west of the current terminal location. Fish and invertebrate species that have been observed in the project location include juvenile salmon, various flatfish, sculpin, shrimp, crabs, and snails.

The proposed project would build a new, much larger, terminal almost directly adjacent to the current one. The proposed design at Tahlequah Ferry terminal location, due to its large trestle size, would require substantially more pile driving than required for the Asarco concepts. This may result in greater potential sound-pressure-wave impact on juvenile salmonids and birds.

The eelgrass beds and patches that were reported previously would need to be resurveyed to confirm their presence and the option footprints surveyed to identify other possible eelgrass beds in the area. If eelgrass is present, mitigation measures could be implemented to relocate the eelgrass to an adjacent site of suitable character.

As with the Asarco location, an in-water work window of July 16 through February 16 is likely to be stipulated. However, because of a bald eagle issue (see below), pile driving could only occur from August 15 through January 1.

Operational impacts of the terminal option sites include scour and shading. Shading impacts would substantially increase over current conditions. Design alternatives to minimize overhead cover in the nearshore areas should be explored to facilitate nearshore passage for juvenile salmonids. The current terminal operation has resulted in some scouring of the seafloor beneath the slips. An area of bottom substrate beneath the new slips would still be scoured, but the scour area would likely be somewhat smaller than it is currently because the slips would be in deeper water and the substrate would be finer. The scour area at the current location (and outside of the predicted scour area for the proposed slips) would most likely need to be restored to natural conditions.

Endangered Species Act

Bald Eagle: There are two bald eagle territories that border the western and eastern sides of Vashon Island. The two territories converge at the southern end of the island near the Tahlequah Ferry terminal location. The existing and proposed ferry terminal location is within the western eagle territory. There is one nest in this territory, which is located about 0.75 miles to the northwest of the proposed dock location. There is one nest in the eastern territory, located about 0.7 miles directly east of the proposed terminal location. Because these nests are within 1 mile of the proposed dock location, the U.S. Fish and Wildlife Service will likely impose a work window of August 15 through January 1 to

minimize noise impacts on nesting eagles. However, this may be negotiated if it can be shown that these nests are not active. This would require a wildlife survey prior to construction and consultation by a U.S. Fish and Wildlife Service eagle specialist.

Marble Murrelet: Due to the lack of suitable mature old growth tree stands, the proposed location of the new Tahlequah Ferry terminal does not contain marbled murrelet nest sites or any potential nest sites. There is also no identified critical habitat in these areas.

Stellar Sea Lion: There are no stellar sea lion breeding grounds or haul-out areas are within the project limits.

Chinook Salmon and Bull: The potential impacts to Chinook salmon and bull trout are essentially the same as those that have been discussed above for marine habitat. The construction of a new ferry terminal to the west would temporarily reduce overall benthic fauna production until it recovers or is restored.

Southern Resident Orca Whales: The Southern Resident Orca Whale population, which includes Puget Sound resident orcas, was proposed for ESA listing on December 16, 2004. Orca whales may be present in the terminal option sites.

Geotechnical Considerations

Parking lots, roads or holding lanes are planned on the hillside above the ferry terminal. Existing published geologic information was reviewed to evaluate where landslide deposits exist in proximity to the planned parking area. As part of Booth's 1991 geologic survey of Vashon Island, existing landslide areas were identified and mapped. At that time, the hillside above the ferry terminal was not mapped as a landslide area and the nearest landslide deposit was located about 1,000 feet to the east of the terminal.
Based on the slope of the hillside, it will be necessary to cut into the hillside and construct some form of retaining wall to provide for the parking and roadway areas. Since the large majority of landslides and slope instabilities occur as a result of the soil becoming over-saturated, positive surface water management will be integral to the parking area design. If the Tahlequah terminal project is determined feasible, it is recommended that a field reconnaissance and geotechnical exploration program be conducted to evaluate the stability of the hillside for the planned parking areas.

NEPA / SEPA Considerations

A project must conform to the requirements of the National Environmental Policy Act (NEPA) when that project includes participation of federal agency. WSF projects typically involve a federal agency, either the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA), because that agency either has committed to or is anticipated to provide funding for project implementation. The federal agency could also be involved because a federal permit will be required, such as U.S. Army Corps of Engineers' Section 10 permit, which is required for placing structures within navigable

waters. Because the project will require construction in the Puget Sound, a Section 10 permit is required and NEPA documentation is necessary (See NEPA/SEPA Appendix).

Based on the currently anticipated number of alternatives, the estimated significance of both positive and negative effects when measures have been included with the project description to minimize those effects, and likely level of agency and public involvement, the appropriate level of environmental documentation is an Environmental Assessment.

NEPA does not include as many public involvement actions for an EA as it does for an EIS. For example, NEPA regulations do not require the sponsoring agency to hold a public scoping period prior to the preparation of an EA or a public meeting to receive comments on an EA once it is prepared. However, the public involvement plan recommend for this project should include a scoping meeting and public hearing.